



Open innovation in Brazil

Exploring opportunities and challenges

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PEN INNOVATION IN BRAZIL: EXPLORING OPPORTUNITIES AND CHALLENGES

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ABSTRACT

While open innovation has been increasingly adopted in developed countries, firms from emerging markets such as Brazil markedly fall behind this trend. Our understanding of the reasons behind this phenomenon remains nevertheless limited, since most research focuses on the industrialized world. In this paper, we aim to inspire the academic community to investigate the issue of why companies from emerging economies such as Brazil have limited open innovation strategies, when they need to draw on external partners as to overcome the institutional, resource and capability constraints they are subject to. We build on the argument that latecomer firms in emerging economies need to actively use open innovation more than ever, as to overcome internal rigidities and spur the innovative resources and capabilities required for the digital transformation and for addressing grand societal challenges. In reviewing current research on openness and especially in the Brazilian setting, we contend that it is a relevant empirical context to study, giving the potential to uncover unique mechanisms and theoretical relations by asking (and possibly answering) novel research questions. Building on a conceptual framework that links various implementation levels of open innovation, we identify themes that are either less well researched or contested and thereby suggest challenges and opportunities for future research.

Keywords: Open innovation. Emerging economies. Latecomer firms. Innovative resources and capabilities.

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THE RELEVANCE OF OPENNESS FOR BRAZIL

The notion that companies should leverage external knowledge sources and engage a broad network of external partners in order to promote innovation has prevailed in the discourse of academia and the business press in the past decade or so (Laursen and Salter, 2006; West and Bogers, 2014). It suggests the execution of a wide range of practices related to external knowledge acquisition and commercialization known under the umbrella of ‘open innovation’ (Chesbrough, 2003; Stanko et al., 2017), which range from simple Internet searches to the involvement of lead users, R&D purchases, venturing, licensing agreements and free revealing of inventions (Burcharth et al., 2014).

In expanding firm boundaries, open innovation thereby affects companies’ business models and strategies (Chesbrough and Appleyard, 2007; Chesbrough and Bogers, 2014). In a world of major technological change powered by digitization, enhanced uncertainty, widely distributed knowledge and shortened product life cycles, the balance between allocation of resources to technologies developed in-house, those acquired externally and those traded in the market is central to the design of successful innovation strategies (Conti et al., 2013).

While open approaches to innovation have been increasingly adopted in developed countries (West, Salter, Vanhaverbeke and Chesbrough, 2014), firms from emerging markets such as Brazil markedly fall behind this trend. Despite governmental efforts to actively promote linkages among actors, such as university-industry relations, in a number of countries (Fu et al., 2014; Guerrero and Urbano, 2017), reversing the picture of disconnected innovation systems has turned out to be challenging. Most Brazilian firms seem to prefer the go alone mode.

In a recent study in which 500 executives were interviewed in 10 major developed and emerging countries, 72 percent of Brazilian

respondents reported that they expect to achieve business growth in new areas through in-house ventures — by far the highest proportion among the countries surveyed. This compares with just more than half of US companies, for example, 37 percent of UK companies and 36 percent of Indian companies.

Moreover, less than 40 percent of Brazilian executives (versus more than twice the number of Chinese respondents) said they would expand either through strategic alliances or joint ventures (the lowest level among OECD economies). This figure amounts to 75 percent in the UK, France and Germany (Accenture, 2015).

The latest data from Brazil’s national statistics office corroborates this finding: only 10.7 percent of Brazilian firms collaborated with other organizations for innovative purposes and around 1.5 percent have partners beyond national borders (Pintec, 2014).

In the United Kingdom, a similarly sized economy, 45 percent of firms collaborate to some degree with external partners during the innovation process, according to the Community Innovation Survey (Laursen and Salter, 2006).

There are, nevertheless, notable exceptions. Aircraft manufacturer Embraer has adopted a risk-sharing partnership model since the mid-1990s for new product development projects that became worldwide best practice in the aerospace industry. The partnership model serves not only as a means of integrating technology from suppliers, but also of reducing investment costs and lead-times (Figueiredo et al., 2008; Armellini et al., 2014).

Another prominent example is the crowdsourcing project managed by car assembler Fiat Brazil in 2010. Known as “Fiat Mio” (or “My Fiat” in English), the project involved more than 17,000 participants from 160 different nationalities and 11,000 novel ideas for the co-

creation of a concept car between customers and the company's engineers and designers (Saldanha et al., 2014). The scant adoption of open innovation practices in Brazil finds resonance in the scientific research. While open innovation has given rise to a prolific and growing academic literature (Dahlander and Gann, 2010; Randhawa et al., 2016; West and Bogers, 2014), it has mostly been analyzed in the context of industrialized economies (Fu et. al., 2014).

The bibliometric analysis of open innovation articles carried out by de Paulo et al. (2017) revealed a huge discrepancy between developed countries (i.e. G7 group) and emerging countries (i.e. BRICS group¹), with the latter group significantly lagging behind both in terms of the quantity and the impact of scientific production in the field.

During the 200-2014 timeframe, the G7 countries published 42 per cent of all publications on open innovation, whereas BRICS responded for 16 per cent (the remaining 42 per cent came from elsewhere). In terms of number of citations, the BRICS also have scarce visibility, and most articles were published in books (de Paulo et al., 2017).

Regarding studies specifically in Brazil, the review of Sabino de Freitas et al. (2017), which was carried out between 2003 and 2016 and included national journals, reveals that open innovation is not yet consolidated in the research agenda of the country. Besides, most work carried out in Brazil draws on single case studies based on qualitative evidence with focus on the extent of adoption and on the benefits of openness (Sabino de Freitas et al., 2017). As a result of the topic being understudied, our understanding of the phenomenon in emerging economies (and in Brazil particularly) remains incomplete.

¹ The G7 group was composed by the following nations: United States, Germany, Canada, France, Japan, Italy and the United Kingdom. The BRICS group was formed by Brazil, Russia, India, China and South Africa.

We have only vague cues to the question about why openness is limited in the country. Some of these cues are lack of trust (Accenture, 2015), protectionist policies, excessively high innovation costs and perceived economic risks (Fu et. al., 2014). We therefore propose that the academic community further investigates why companies from emerging economies such as Brazil have limited open innovation strategies, when they need to a large extent to draw on external partners as to overcome the institutional, resource and capability constraints they are subject to.

This relevant issue deserves scholarly attention for three reasons. First, the current global landscape of R&D and innovation has shifted significantly with the expansion of talents and technological competencies worldwide. Not only multinationals from developed countries are increasingly internationalizing innovation activities as to leverage competitive advantages from local markets, but also some firms from emerging economies such as Brazil, China, South Korea and India consolidated as key players in various technology-intensive sectors like mobile communications, aerospace, information technology and electronics (Li and Kozhikode, 2009).

Second, the idiosyncrasies of emerging economies make it a rich and prolific empirical context. As they contrast in terms of weak intellectual property protection, immature industrial standards and regulations (Fu et al., 2014), as well as weakened social capital, the theoretical mechanisms behind openness and its implementation are likely to play out differently. As an example, the study of Luo (2005) reveals that the perception of justice between partners is a key driver explicating the profitability of interorganizational alliances in China.

Third, collaborative strategies like open innovation are especially necessary in periods marked by significant innovation opportunities and great uncertainty in the economic environment. In a global context, a number of grand challenges have emerged that affect both

developed and developing economies, and essentially give rise to a need for more open and collaborative solutions for complex problems (George et al., 2016). As such, many developing trends will affect innovation practices and policies as they need to be adjusted to face the emerging complexities in the new innovation landscape (Bogers et al., 2018). At times of momentous transformation and technological change as the one presently brought about by digitization (Nambisan et al., 2017), new windows of opportunity emerge for latecomer firms, especially those operating in emerging economies.

The consequences of creative destruction following major technological change indeed establish favorable conditions for catching up processes. Such consequences include the release of barriers to entry (due to low requirements of capital, managerial skills and intellectual property rights) and the creation of new sectors while others become obsolete (Perez and Soete, 1988).

To take advantage of these windows of opportunities, latecomer firms need to learn while everyone else is also doing so – an endeavor they can rarely pursue on their own. As indicated by Schilling (2015), major technology shocks induce collaborative behavior, which in turn has a positive effect on subsequent innovation.

In this paper, we explore the context of emerging economies in a changing innovation landscape. We consider to what extent and how latecomer firms in such economies can or should actively implement open innovation, in their pursuit to overcome internal rigidities and spur the innovative resources and capabilities required in the face of key challenges and trends such as digital transformation.

In reviewing current research on openness and especially in the Brazilian setting, we contend that it is a relevant empirical context to study because it gives the academic community potential to uncover unique mechanisms and theoretical relations by asking (and possibly

answering) novel research questions. Building on a conceptual framework that links various implementation levels of open innovation, we identify themes that are either less well researched or contested and thereby suggest challenges and opportunities for future research.

2. A Framework for Open Innovation

2.1 The Nature and Value of Open Innovation

Open innovation is defined as “a distributed innovation process that involves purposively managed knowledge flows across the organizational boundary” (Chesbrough and Bogers, 2014:4). Put simply, it describes the phenomenon of companies making use of externally generated ideas and technologies in their own business, and letting unused internal ideas and technologies be applied by others in their businesses (Chesbrough and Bogers, 2014).

Open innovation builds on the central notion that, in order to build competitive product portfolios, firms combine the benefits of economizing on transaction costs through vertical integration (Williamson, 1975) with the benefits of leveraging technological expertise and flexibility through strategic outsourcing (Powell, Dopot, and Smith-Doerr, 1996) and the sales of knowledge assets (Fosfuri, 2006). The underlying assumption is that in-house R&D and external sourcing are complementary (Cassiman and Veugelers, 2006).

The logic of openness integrates knowledge flows with pecuniary and non-pecuniary mechanisms, as well as the inward and outward flows. It is a broad concept encompassing different dimensions that co-exist simultaneously. Most studies distinguish between the dimensions of inbound – the outside-in perspective related to the in-licensing agreements, crowdsourcing, customer involvement and R&D purchases – and outbound – the inside-out perspective related to out-licensing agreements, free revealing and spin-offs. A third dimension is the coupled one, which implies combined knowledge inflows and outflows between partners in the innovation

process – a perspective that involves any combination of the above-mentioned practices, alongside strategic alliances, consortia, networks, ecosystems and platforms (Chesbrough and Bogers, 2014; Dahlander and Gann, 2010).

In terms of performance outcomes, open innovation is recognized as a means of accelerating internal processes and of increasing the value of innovative efforts (Van de Vrande et al., 2009). Despite the significant costs related to knowledge absorption, time and managerial attention (Knudsen and Mortensen, 2011; Laursen and Salter, 2006), open innovation is expected to facilitate access to resources, knowledge and competencies otherwise unavailable to the firm, as well as enable companies to better realize the monetary and strategic potential of the active commercialization of knowledge (Faems, de Visser, Andries and Van Looy, 2010; Gassmann, Enkel, and Chesbrough, 2010; Huizingh, 2011).

Anecdotal evidence shows a substantial increase (nearly 60%) in the R&D productivity of companies that implemented an open innovation approach (Huston and Sakkab, 2006). Even if the outcomes are not entirely positive (Cassiman and Valentini, 2015), open innovation is acclaimed for its potential to lead to improved innovative output and firm performance (Burcharth et al., 2017; Laursen and Salter, 2006; Van de Vrande et al., 2009). This seems also to be the case for Brazilian companies that adopted open innovation, as previous studies have largely emphasized benefits such as risk and cost reduction (Sabino de Freitas et al., 2017).

2.2 The Implementation of Open Innovation

Despite the overall optimistic expectations, many companies struggle with the implementation of open innovation. This is due to a myriad of interrelated factors that go beyond the macroeconomic or societal context to encompass organizational and individual factors too. In addition to the industrial policy, competition policy and intellectual property

rights regime, the State generates “windows of opportunity” and positive externalities that may foster (or hamper) the formation of collaboration between companies, consumers, universities, financial organizations and civil society groups (Milagres and Burcharth, 2019). There are industrial differences regarding the incidence towards open innovation too. Existing evidence suggests that companies are more prone to engage in open innovation if they belong to high technology-intensity, globalized and manufacturing sectors. Besides, larger companies seem to be more open as they enjoy the benefits of having more diversified innovation portfolios, access to funds and formal structures for licensing intellectual property and external participations, in comparison to their small and medium-sized counterparts (Van de Vrande et al., 2009).

Managerial issues at the organizational-level are specially challenging. This is because decisions related to the governance mode (open vs. closed) are taken at the problem level, where trade-offs can be best evaluated. Instead of pursuing a generalist innovation strategy, companies define the optimal governance of innovation depended on the nature of the problem to be solved (Pisano and Verganti, 2008). As each governance form offers access to different types of communication channels, incentives and property rights, it supplements each other (Felin and Zenger, 2014).

Other relevant aspects of internal organization are: 1) organizational structure, 2) organizational procedures, 3) rewards and incentive systems and 4) job design (i.e. autonomy) (Buganza et al., 2011). The first aspect primarily relates to the allocation of decision rights. Delegation, particularly to the weaker party, has been found to facilitate external collaboration (Bianchi et al., 2011; Foss et al., 2011; Gambardella and Panico, 2014).

The second aspect refers to procedures that facilitate internal communication and knowledge exchange, following Cohen and Levinthal (1990)’s specification of the inward-

looking dimensions of absorptive capacity. Such procedures support openness because they secure the involvement of other parts of the organization for the exploitation of externally drawn knowledge (Foss et al., 2011). In this respect, the connection of innovation groups to internal business units plays a key role in the absorption and dissemination of knowledge, which provides the basis for the generation of concrete business opportunities. The provision of incentives and rewards systems is the third aspect and the one that has raised most interest and at the same time most controversy.

Whereas Fu (2012) discovered that the overall importance of incentives diminishes when firms open up for innovation, Foss et al. (2011) found that paying employees to acquire and share knowledge is useful for tapping customer contributions, whereas Bianchi et al. (2011) realized that extrinsic rewards did not affect licensing managers. Regarding the fourth aspect (job design), ensuring autonomy to employees in the form of time, freedom and independence to conduct their work is positively associated with a successful implementation of open innovation (Burcharth et al., 2017).

Moreover, there is an increasing focus on the “human side”, that is, on individual-level antecedents of open innovation that explain the extent of adoption (Gassmann et al., 2010). This is important because employees behave differently when interacting with external partners, not only in terms of their mindsets and how they build partnerships, but also in how they take advantage of them (Salter et al., 2014). This seems to be related to their educational background, as knowledge diversity is found to be associated with increased firm-level openness (Bogers et al., 2018).

Another key issue is the employee’s attitudes to knowledge. The literature defends a balanced view, according to which individuals should search for useful knowledge regardless of its source of origin. Protective attitudes against knowledge sourcing and knowledge sharing in the form of the not-invented-here (NIH) and the not-shared-here (NSH) syndromes have

detrimental consequences for open innovation incidence (Burcharth et al. 2014).

2.3 A Framework for Investigating the Implementation of Open Innovation in Brazil

Prior research thus suggests that the implementation of open innovation is a highly complex phenomenon that calls for a multi-level approach. While existing findings stem mostly from the context of developed economies, novel mechanisms are likely to unfold in emerging economies, making its execution even more intricate. Not only the obvious role of culture in determining the forms and preferences for the various types of knowledge (Bhagat et al., 2002) may have a significant impact, but also some of the central tenets of openness may be challenged.

As the investigation of Pitassi (2014) encompassing some of the largest Brazilian multinationals reveal, there is a low level, and even a lack of understanding, of open innovation premises among executives in the country. For instance, one of the most important facets of any model of open innovation is securing new partners and sources of ideas – a facet that becomes challenging when shared trust is very low.

Another assumption is that external technological sales via licensing agreements largely rely on the enforcement of intellectual property rights, as they reduce the frictions of (the otherwise inefficient) markets for technology – what is rarely the case in less-developed countries.

In order to address the issue of why openness is limited in the context of emerging economies such as Brazil, it is paramount to further break it down into different levels of analysis. According to Chesbrough and Bogers (2014), the possible units of analysis identified for open innovation research are: 1) intra-organizational, 2) organizational, 3) extra-organizational, 4) inter-organizational, 5)

industry, 6) regional innovation systems and 7) society.

We follow this classification with the view of proposing a number of sub-questions that may inspire scholarly work in the field, **as presented in Table 1**. These questions illustrate how this framework can be applied to the general context of emerging economies. It provides questions that can be useful to better understand the particular situation in such economies, at the

same time that can open up new theoretical explorations (based on a different empirical context than most open innovation research). As such, this list of questions is not intended to be an exhaustive one, but rather indicative for the types of topics (mechanisms, antecedents and outcomes) that can be examined. It aims at inspiring the academic community to discover novel contingencies and conditions for open innovation, given the nature of the context.

Table 1
Opportunities and Challenges for Research on Open Innovation in Emerging Economies per Unit of Analysis

Unit of Analysis	Possible Research Object	Possible Research Questions for Emerging Economies
Intra-organizational	Individual Group/ team Project Functional Area Business unit	How do individuals interact and share knowledge when technological skills and capabilities are limited? Why is there low trust among people? What motivates individuals and groups to exchange knowledge in contexts of low trust? How does implementation of open innovation take place in immature institutional settings?
Organizational	Firm Other (non-firm organization) Strategy Business model	How does open innovation strategy play out in very hierarchical organizational structures? How does open innovation strategy play out in governmental organizations with high levels of bureaucracy? Do firms value foreign external knowledge more or less in emerging economies? Are there significant differences between multinationals and indigenous firms?
Extra-organizational	External stakeholders: Individual, Community and organization	How do digital platforms like social media foster or limit collaboration in contexts of sparse relations? What is the role of business communities and associations in overcoming the barriers of collaboration?
Inter-organizational	Alliance Network System	What kinds of alliance governance modes work better in immature institutional settings? How are inter-organizational mechanisms of knowledge exchange developed in contexts of weak IP protection?
Industry	Industry development Inter-industry differences	Are firms from technology-intensive sectors of emerging countries more or less open than its counterparts?
Regional innovation systems	Local region Nation Supra-national institution	What explains differences across regions in the degree of openness? How does the judicial system impact openness?
Society	Citizens Public policies	What are the public policies necessary to stimulate open innovation in the context of emerging economies? What is the relation between degree of maturity in democracy and openness? Is there a relation between corruption and degree of openness?

Source: Authors' elaboration based on Chesbrough and Bogers (2014).

3. Opportunities and Challenges of Open Innovation in Brazil

On the basis of the above, we see some specific opportunities and challenges related to open innovation research in a country like Brazil. As the 8th largest world economy in terms of GDP (Gross Domestic Product), Brazil figures as in the 60th position in terms of competitiveness, according to a ranking of 63 countries (IMD, 2018). It also languishes in 64th place on the 126-country Global Innovation Index (2018). While the Brazilian economy has been dominated by natural resource sectors such as agriculture, it is increasingly gaining global prominence also in knowledge-intensive ones, as diverse as biotechnology, clean energy and aerospace.

We contend that the Brazilian context is particularly interesting and fruitful for open innovation research because it is one of the most extreme ones regarding the extent that companies are closed, according to recent international comparisons (Accenture, 2015). It may be thus characterized as a ‘polar type’ case in the terminology of Eisenhardt and Graebner (2007).

These authors recommend this methodological approach on the basis of the argument that such cases are theoretically very rich, because they allow for the observation of contrasting patterns which in turn can lead to a very clear understanding of the logic of the focal phenomenon, its underlying constructs and relationships.

Our list of suggested themes is presented below:

3.1. Trust, corruption and the establishment of external relations

At a first glance, the low level of adoption of open innovation seems to be at odds with the high use of social media and the relational characteristic of Brazilian culture, which places strong emphasis on personal relationships and networks in the business context (Accenture, 2015). Brazilian consumers are some of the highest social media users globally. In fact, Brazil

was the leader among 20 markets covered by Euromonitor’s Global Consumer Trends Survey 2016 in terms of visits or updates in social networking sites daily (Adhikary, 2018). A more careful analysis though reveals that the low level of interpersonal trust is a significant vulnerability negatively impacting collaboration in the country. Despite Brazilians’ cultural inclination for networking, a “trust deficit” may in fact be one of the country’s major handicaps.

Brazilians are eager to socialize with one another, yet very reluctant to trust one another. In a 2014 worldwide investigation conducted by the World’s Value Survey, only 6.5% percent of Brazilians said they most people can be trusted (Inglehart et al., 2014). This figure compares to 62.7% in China, 33% in India, 27.7% in Russia and 23.5% in South Africa – just to mention other comparable BRICS nations.

The major corruption scandal known as ‘Operation Car Wash’ that followed since then is expected to further erode trust in the country. Launched in March 2014, the operation began as an investigation into money laundering that ended up uncovering a vast and intricate web of political and corporate racketeering that encompasses more than US\$ 5 billion in illegal transactions, and over 800 politicians and members of the business elite, including at the presidential level (The Guardian, 2019). This is likely to have major implication for the establishment of external relations, as both individuals and organizations become even more concerned in being linked to partners with the potential of being under criminal charge.

This challenges the premise of societies where ethical standards in businesses are the prevalent norm and where open innovation has been most extensively investigated. What is more, open innovation may even enable further corruption in low trust societies. Collaboration can be used for forging privileges, granting access to illegal resources and other dubious transactions.

This context opens up interesting research opportunities for understanding the mechanisms

that may circumvent the low levels of trust to enable for co-creation in an innovation ecosystem. Such mechanisms may involve not only novel control mechanisms, but also novel ways of selecting external partners and of establishing business models, where the logic of creating and capturing value between partners may be substantially different.

3.2 Hierarchical structures and the implementation of open practices

Open innovation does not happen spontaneously. An appropriate organizational context is needed to facilitate, coordinate and decide on a suitable power structure that supports processes of external knowledge integration and commercialization. From previous research, we know that employee autonomy is a crucial element to increase the adoption rate and the ability of firms to profit from openness (Burcharth et al., 2017; Foss et al., 2011). Brazilian firms are typically highly stratified and based on authoritative, centralized and hierarchical structures. As a result, they are traditionally considered unlikely to innovate, often experiencing difficulties in managing technology (Nagano et al., 2014).

By examining how the combination of highly centralized managerial structures affect openness, we can better understand the implications of internal organizational elements to innovation. Performance outcomes of open innovation could be different in low levels of autonomy. An interesting analogy to conglomerates exemplifies this issue. While conglomerates are deemed to be economically inefficient in advanced economies, they represent desirable properties in emerging ones.

Besides, the behavior of employees engaged in open innovation may alter substantially, as they lack decision power, agility and the freedom to engage in the daily pursuit of collaboration. As it has been previously documented (Salter et al., 2014), open innovation alters the work practices of professionals directly engaged with it. R&D professionals, for instance, are challenged to do

more than internal new product development, and to use innovation intermediaries, interact with users, negotiate licensing agreements and organize innovation tournaments (“hackatons”) involving outsiders. More generally, there is much to be learned about the microfoundations of individual action within open innovation practices (West and Bogers, 2014), in particular in the extreme context of hierarchical and mechanistic structures that Brazil represents. As put forward by Salter et al. (2014:77), “in order to realize the benefits from openness, as much attention is required to the firm’s internal face as to its external face”.

3.3 Bureaucracy, lack of flexibility and the exploitation of external knowledge

Thanks to a multitude of fiscal and infrastructural complexities, Brazil is a high-cost economy. Indeed, Brazilians refer to their Byzantine bureaucracy as “custo Brasil” (literally, “the Brazil cost”). Not only entrepreneurs, scientists and executives need help to better understand the regulatory framework, but also they often perceive a multitude of legislative barriers that constrain linkages between organizations.

A key issue, for instance, is that compliance to regulation takes up a lot of resources intended for innovation. Another common complaint is that executives feel trapped in unfavorable contracts. The lack of flexibility and knowledge about the regulatory framework increases the uncertainty that is inherent to the innovation process, particularly when it involves the exploitation of external knowledge. This likely is aggravated in the face of upcoming technological trends, such as artificial intelligence, blockchain and Internet of Things, which demand continuous evolution of standards and adjustment of laws.

As open innovation depends on a large number of systemic factors including the incentives and obstacles set by the existing regulatory framework, studies in contexts of intense bureaucracy may give unique insights.

We need to further understand in which ways the demands for formal governance mechanisms (i.e. contracts, judicial actions and directives) impact the various open innovation practices. While pecuniary transactions such as technological licensing agreements and R&D purchases are naturally formalized, non-pecuniary practices involving crowdsourcing, hackatons and free revealing of inventions may be more affected by bureaucracy.

The quality and intensity of knowledge transfer among partners may be impacted too. The control mechanisms underlying excessive bureaucracy determines the effort spent in collaboration, the commitment and the disposition to take risks in this regard (Milagres and Burcharth, 2019).

Another related issue is timing: bureaucracy increases negotiation time and may slow down the engagement with external actors. This brings about both negative and positive consequences that we are still not aware of.

3.4 Culture and the NIH syndrome

Internal resistance to ideas coming from outsiders or exploited by outsiders are key intra-organizational barriers to open innovation. Known as the 'Not-invented-here' (NIH) and 'not-shared' (NSH) syndromes, these attitudes respectively reduce the use of inbound and outbound practices. This is because the implementation of open innovation rests on an initial valuation of outside competences and know-how by the management, founded on the willingness of employees to collaborate, and weighted against the organization's ability to fully exploit purposive inflows and outflows of knowledge (Burcharth et al., 2014).

While the NIH and NSH syndromes are found to be pervasive attitudes in developed economies, we still do not know if this is the case in Brazil. There is one main reason to question it: the collective inferiority complex felt by Brazilian people in comparison to the rest of the world, popularly known as "Mongrel complex" (Portuguese: "*complexo de vira-lata*"). Coined by the playwright Nelson Rodrigues in the 1950s,

the Mongrel complex is related to a nation-wide and voluntary low self-esteem implying that what originates from elsewhere (products, knowledge, ideas, etc.) is highly valuable. "Everything that comes from abroad is best", "nothing can work here" are some of the maxims expressing this complex. Not only Brazilians feel insecure about themselves, but also tend to appreciate foreign viewpoints, goods and trends to the detriment of what is developed inside.

As a result, one may expect the prevalence of overly positive attitudes to knowledge insourcing and external exploitation, and not the negative ones expressed in the NIH and NSH syndromes. Qualitative evidence indicates that this phenomenon may indeed exist (Menon and Pfeffer, 2003).

Empirical investigations focusing on attitudes to knowledge in Brazil constitute indeed a much needed and fruitful avenue of scholarly work. Regardless of the prevalence of negative or positive attitudes in the country, we need to better understand how they link to culture. There may exist other cultural nuances beyond the Mongrel complex that can affect the NIH and NSH syndromes, which deserve careful attention.

3.5 Comparative studies with other emerging economies

Another prolific area for future research are comparative studies with other emerging economies. Such studies may elucidate which mechanisms of openness that are exclusive of the Brazilian context and which mechanisms are present in other similar contexts.

In Mexico, merely 10% of companies work with either other commercial agents, scientific institutions or diverse agents (Guerrero and Urbano, 2017) and in Turkey, the Community Innovation Survey data show that only 8% of firms cooperate to develop new products (Temel et. al., 2013). As external collaboration seems challenging in other countries too, we encourage the investigation of the commonalities and differences among them.

4. Conclusion

In this paper, we propose the context of emerging economies as fertile ground to study open innovation, not only because such countries may benefit from applying some of the related concepts but also because the unique empirical context may give rise to novel theoretical insights. We build on a framework that highlights specific levels of analysis that researchers have considered open innovation, and we use it to develop some relevant questions in the context of emerging economies.

We also specifically use the case of Brazil to show which particular opportunities and challenges can emerge from developing such a framework. We hope that our contribution can inspire more focus on open innovation in Brazil and other emerging economies, both to contribute to open innovation practices and policies in those contexts and to explore new research questions and designs to ultimately discover novel contingencies and conditions for open innovation more generally.

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